City of Raleigh
Public Utilities Department

CROSS CONNECTION PROGRAM

City of Raleigh
Public Utilities Handbook, 2005
Backflow Section

6) That a fire protection plan in triplicate be drawn up and approved by the Public Utilities Department and the Fire Protection Inspector. All water mains, valves and fire hydrants shall conform to the City's standards and specifications.

7) The City will maintain all water connections within the street right-of-way at no charge to the property owner. Repairs on private property shall be the responsibility of the property owner or customer.

f. Water Backflow/Cross Connection

1) All existing and proposed water services, dedicated fire and irrigation lines and private distribution systems must be provided with an approved backflow prevention assembly based on a "schedule of compliance" as determined by the Public Utilities Director and in accordance with City of Raleigh Code Part 8 Article D. For projects having any combination of these lines, suitable approved assemblies must be provided for containment of each level Questions concerning Raleigh's Backflow/Cross-Connection Prevention Program should be directed to the Public Utilities Cross Connection Coordinator at 870-2897.

2) On service lines serving a facility that is in operation continuously, the lines must have parallel backflow prevention assemblies on a single service line or adequate protection on each supply line to that facility. On parallel installations each assembly must be the same type (two double check valve assemblies, two double detector check valve assemblies, two reduced pressure zone device assemblies, or two reduced pressure zone detector check assemblies). In some cases, these assemblies must be the same size as the service line. The rule to normally use in this situation is that the assembly must have the square of the diameters equal to the square of the supply service "tap". For example, an 8-in service line would need at a minimum two 6-in devices in parallel.

3) The Public Utilities Department approved backflow prevention assemblies shall be installed above ground. Assemblies may be installed inside of buildings as long as there are no unprotected taps between the main and the building. The minimum drain size in an above ground vault for double check assemblies and double detector check valves is 4 inches. An approved dual check valve must be installed at the meter service on single family residential service lines. OS&Y shut-off valves shall be used on all fire line backflow prevention assemblies (2 ½" or larger). All testable backflow prevention assemblies shall have approved test cock (as listed in section III.1.F.10). Approved installations are shown on Details W-34 thru W-39.

4) If the fire lines, private distribution systems or domestic service lines are connected to any "processed water" sources, or booster pump system, backflow protection shall be provided by using the USC approved Reduced Pressure principle zone assembly (RP) type assembly (fire lines require a reduced pressure detector assembly). "Processed water" is water where extra chemicals are added by the user on site to reduce freezing, pipe corrosion, etc. This RP assembly shall include the resilient wedge valves and test cocks, and the RP unit shall meet the requirements of AWWA standard C-506-78. If the RP assembly is 2½" or larger, then it must be supplied with OS&Y shut-off valves. The unit shall be housed in an above ground vault, insulated above ground enclosure, or inside of a building. RP's are required on all mall service connections due to change of use. No RP's may be installed below ground

5) If the backflow preventer is located on site for fire lines, then it shall be located outside the structure, which it is serving unless otherwise approved by the Public Utilities Department. **If there are no unprotected taps between the street and building it can be located in the building**. All internal or confinement assemblies (isolation assemblies) will have strainers upstream of the device with the exception of devices on firelines.

6) No person shall fill special use tanks or tankers containing pesticides, fertilizers, or other toxic chemicals or their residues from a public water system except at a location equipped with an approved air gap (2 X diameter of supply pipe with a minimum gap of 1") or an approved reduced pressure backflow preventer properly installed on the public water supply. No supplier of water shall permit the filling of such special use containers except at locations so equipped.

7) Backflow prevention assemblies shall be installed at a minimum height of 12 inches and a maximum height of 60 inches above the floor or ground. Assemblies shall also have a clear horizontal distance of 18 inches around the entire diameter of the device.

8) The backflow prevention assembly(s) must be readily accessible at all times. Readily accessible means that only a one piece cover must be removed for an outside installation to test or perform maintenance on the assembly.

9) Defacing a backflow prevention assembly will not be allowed. Defacing would include anything that might obscure pertinent information on that assembly (i.e.) nameplate, serial number, etc. Any assembly that is missing a nametag or information stamped in the body will not be considered to be an acceptable assembly installation and must be replaced upon notification by the City (This applies to new assemblies only).

10) Backflow prevention assemblies must be installed, tested and maintained by persons that have completed the City of Raleigh Cross Connection School or other approved Cross Connection School. It is also required that all assemblies be tested at the time of installation and annually thereafter. All assemblies must also have the rubber parts changed every five years.

The list of approved test equipment follows:

Mid-West Model	830, 844, & 845
Watts	TK-DP, All assemblies
Watts	TK-99D
Pro-Master	RP Test kit

* Test equipment shall be calibrated yearly.

All assemblies ¾-inch – 2-inch must have a ball valve that is full port, have a blow-out proof stem, have resilient seats and a 400 psi WOG rating (water, oil or gas). All assemblies 2 ½-inch–10-inch must have fusion bonded, epoxy coated resilient wedge valve. All test cocks must be approved ball valves of the appropriate size.

11) All backflow prevention assemblies installed outside of buildings must be installed in an approved enclosure with the exception of residential lawn irrigation backflow prevention assemblies. All enclosures shall be insulated and shall meet the requirements of ASSE standard 1060.

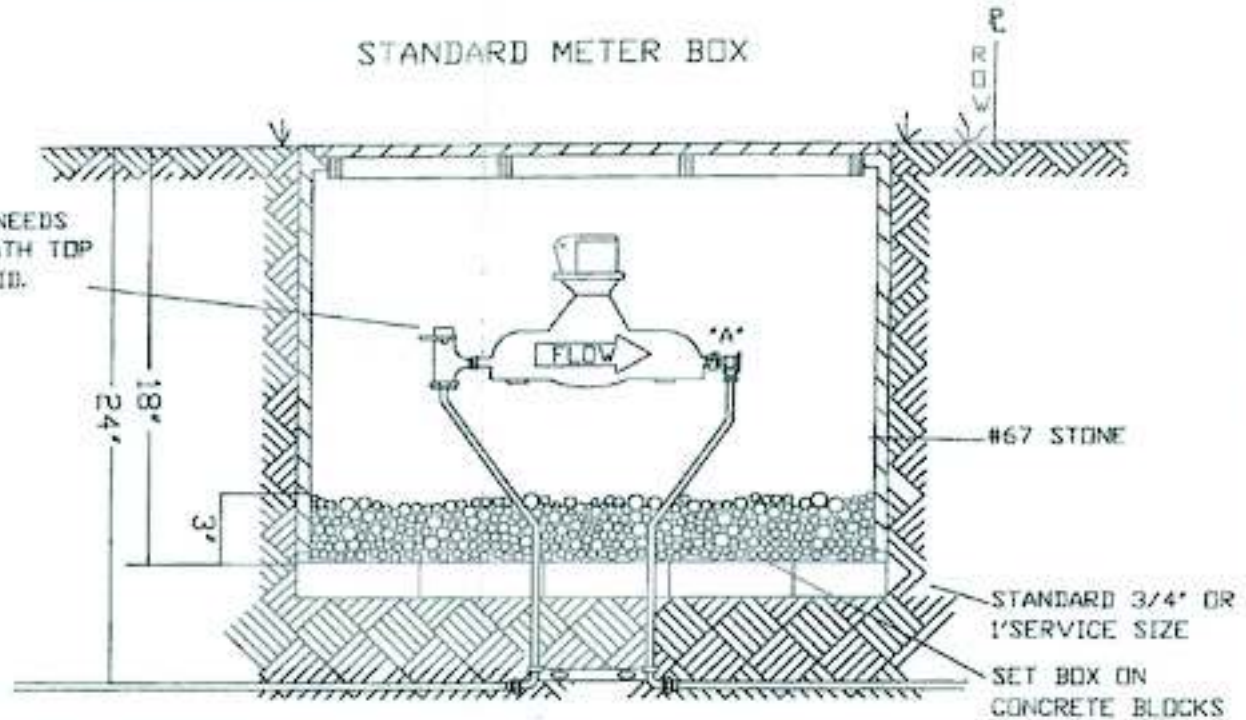
12) Double check valves and double detector check valves may be installed horizontally or vertically (see approved list). Reduced pressure backflow prevention assemblies shall be installed only horizontally.

13) All fire sprinkler system backflow prevention assembly enclosures shall be equipped with a heater that is recommended by the enclosure manufacturer.

g. Installation Restrictions for Design

1) All water mains, of proper size as determined by the Public Utilities Department, shall be installed complete, along all boundaries abutting existing public roadways, from property line to property line regardless of the land use, proposed lot arrangement of the subdivided property or the availability of connection to a main in service. Within all dead-end streets that may be extended, the water main must extend to the property line of the subdivision.

STANDARD METER BOX



THE BACKFLOW PREVENTER LOCATION IS DEPENDENT ON THE TYPE DEVICE PROPOSED FOR USE AS FOLLOWS:

LOCATION	DEVICE
"A"	FORD ANGLE CHECK (VHH-71-12W FOR 3/4") (VHH-74-12W FOR 1")

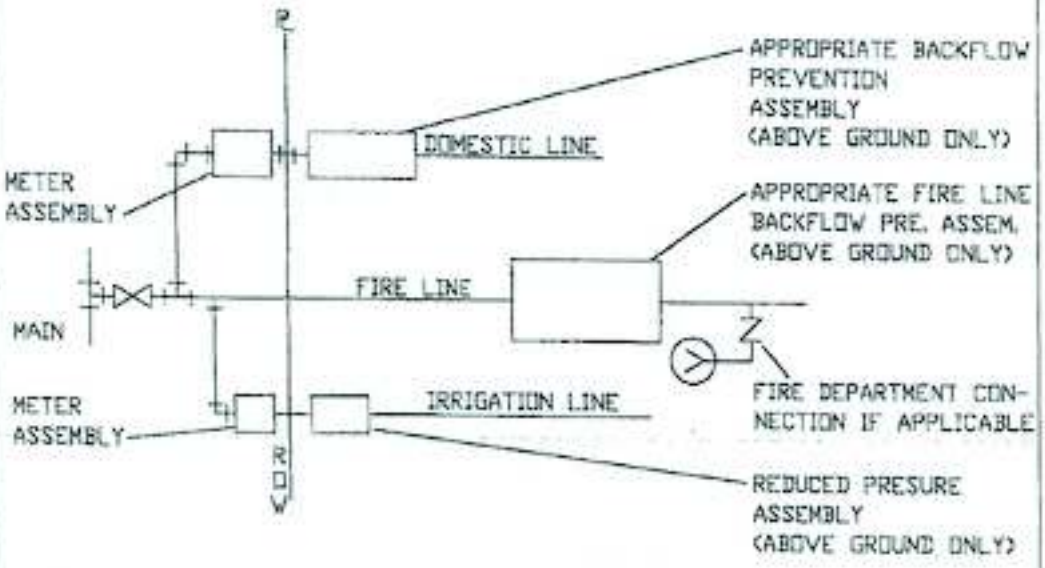
NOTE:
MAY NEED ADDITIONAL BACKFLOW PREVENTION DEVICES IF USED ON MORE THAN TWO RESIDENTIAL UNITS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

SINGLE FAMILY, RESIDENTIAL, NEW CONSTRUCTION, BACKFLOW PREVENTION/ METER ASSEMBLY INSTALLATION

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-24	Y.G.A.	4-23-90		
	T.C.A.	12-31-91	A.B.B.	4-7-04

MINIMUM VAULT SIZE (INSIDE DIMENSIONS)	
4"	4' 9" x 7' 2"
6"	5' 0" x 8' 2"
8"	5' 2" x 9' 7"
10"	5' 5" x 11' 6"



1. SERVICE TAPS FOR 2" AND SMALLER DOMESTIC SERVICES MAY BE BY CORPORATION COCKS. LARGER SERVICES WILL REQUIRE A TEE AND GATE VALVE OR TAPPING SLEEVE AND VALVE ASSEMBLY AND 90° BEND.

2. DOMESTIC SERVICE TAPS SHALL BE ALLOWED ONLY ON 6" OR LARGER FIRE LINES BEFORE THE BACKFLOW ASSEMBLY.

3. ONE DOMESTIC TAP PER FIRE LINE ON STREET SIDE OF BACKFLOW.

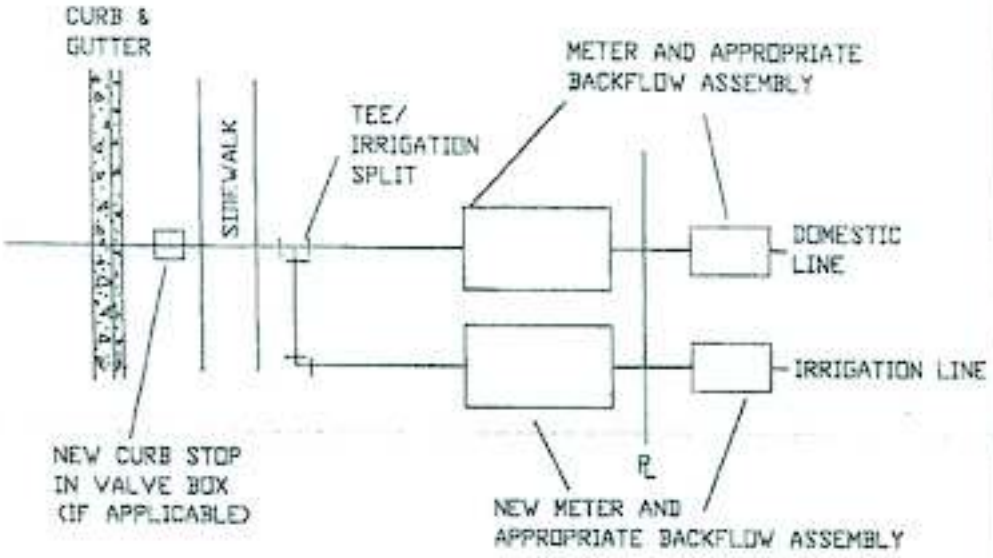
4. FIRE LINE SHALL HAVE A FIRE HYDRANT OR BLOW OFF ASSEMBLY AT ITS END TO FACILITATE FLUSHING WHEN NEEDED.

CITY OF RALEIGH

DEPARTMENT OF PUBLIC UTILITIES

FIRE, DOMESTIC & IRRIGATION OPTIONS SCHEMATIC

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-34	D.W.C.	11-18-99	A.B.B.	7-10-04
	RRH	3-31-00		

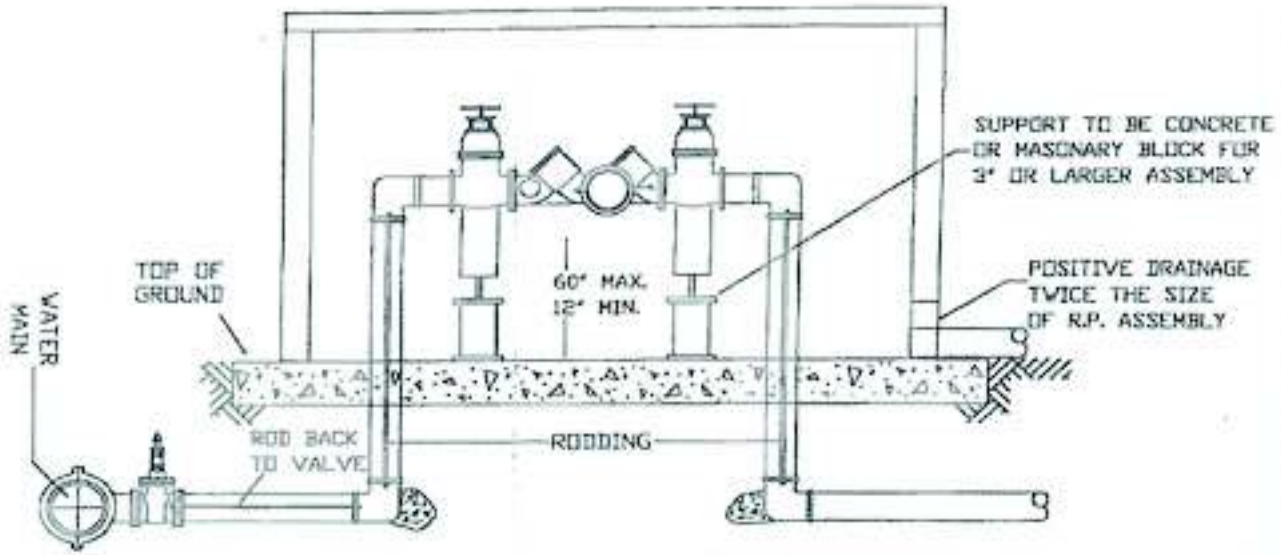


CITY OF RALEIGH

DEPARTMENT OF PUBLIC UTILITIES

IRRIGATION TAP ON NEW AND EXISTING SERVICES

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-35	Y.C.A.	12-31-91	ABB	7-10-04
	RRH	5-31-00		

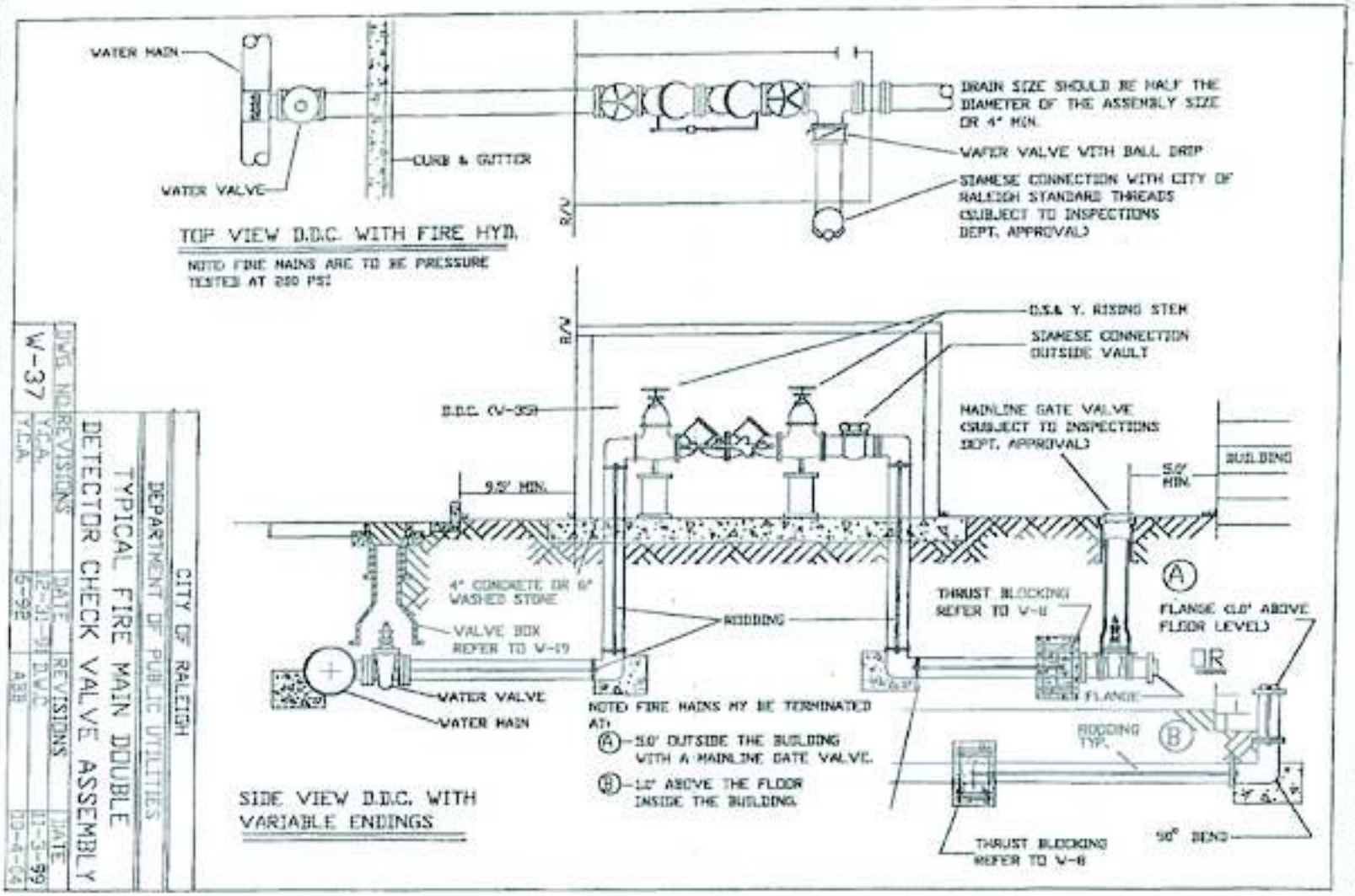


1. ALL ABOVE GROUND ENCLOSURES MUST HAVE ADEQUATE DRAINAGE (TWICE THE DIAMETER OF THE R.P. ASSEMBLY OR EQUIVALENT).
2. REDUCED PRESSURE BACKFLOW PRESENTERS MAY BE LOCATED IN A BUILDING PROVIDED THERE ARE NO OTHER UNPROTECTED TAPS BETWEEN THE MAIN AND THE BUILDING.
3. ABOVE GROUND INSULATED VAULTS MUST BE ASSE 1060 APPROVED ABOVE GROUND ENCLOSURES.
4. RESIDENTIAL LAWN IRRIGATION R.P. ASSEMBLIES THAT ARE REMOVED TO PREVENT FREEZING IN THE WINTER MONTHS MUST BE CAPPED OFF.
5. STANDPIPES FOR ALL IRRIGATION R.P. ASSEMBLIES ARE TO BE COPPER OR BRASS.
6. FOR VAULT DIMENSIONS SEE DETAIL W-30
7. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

REDUCED PRESSURE BACKFLOW PREVENTER

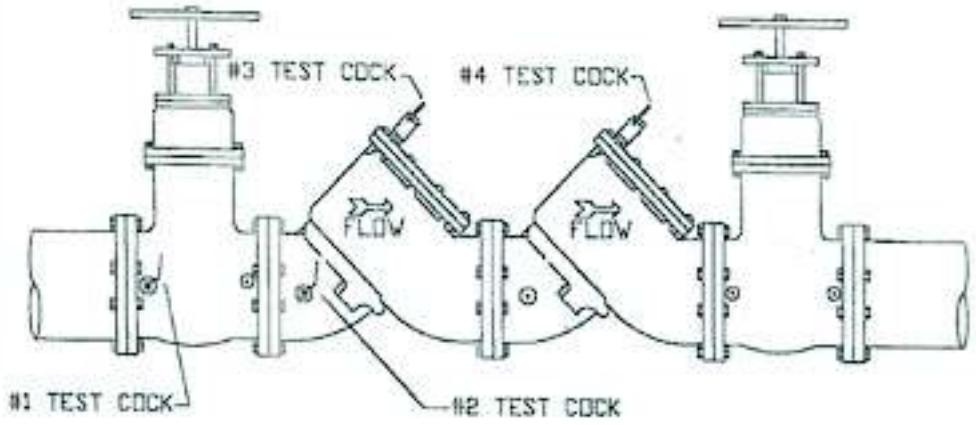
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-36	A.L.A.	12-21-91	A.B.B.	7-10-04
	D.W.S.	11-8-99		



DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-37	V.C.A.	12-31-91	D.W.C.	11-3-99
	V.C.A.	6-92	ABB	10-4-04

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

TYPICAL FIRE MAIN DOUBLE DETECTOR CHECK VALVE ASSEMBLY



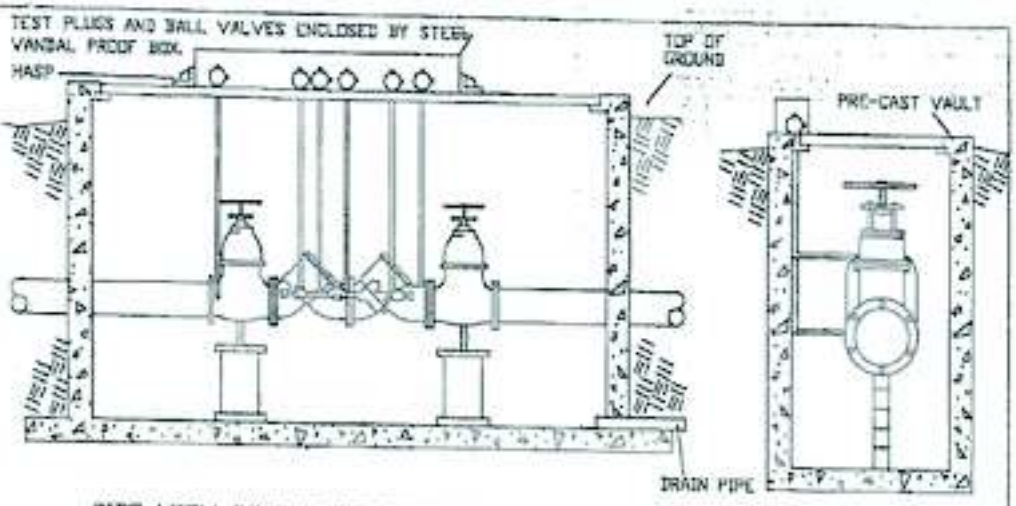
1. SHUT-OFF VALVES, CHECK VALVES, AND TEST COCKS SHALL BE STANDARD TO THE APPROVED BACKFLOW ASSEMBLY.
2. ALL ASSEMBLIES TO BE SUPPORTED BY A CRADLE.
3. ENCLOSURE FOUNDATIONS SHALL BE CONSTRUCTED OF 4' OF CONCRETE OR 6' OF STONE.
4. ASSEMBLIES MUST BE ON CURRENT APPROVAL LIST.
5. 2 1/2' AND LARGER ASSEMBLIES SHALL BE FUSION BONDED EPOXY COATED INCLUDING SHUTOFF VALVES.

CITY OF RALEIGH

DEPARTMENT OF PUBLIC UTILITIES

STANDARD DOUBLE CHECK VALVE ASSEMBLY

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-38		3-1-87	RRH	9-30-00
	D.W.C.	12-29-99	A.B.B.	4-13-04

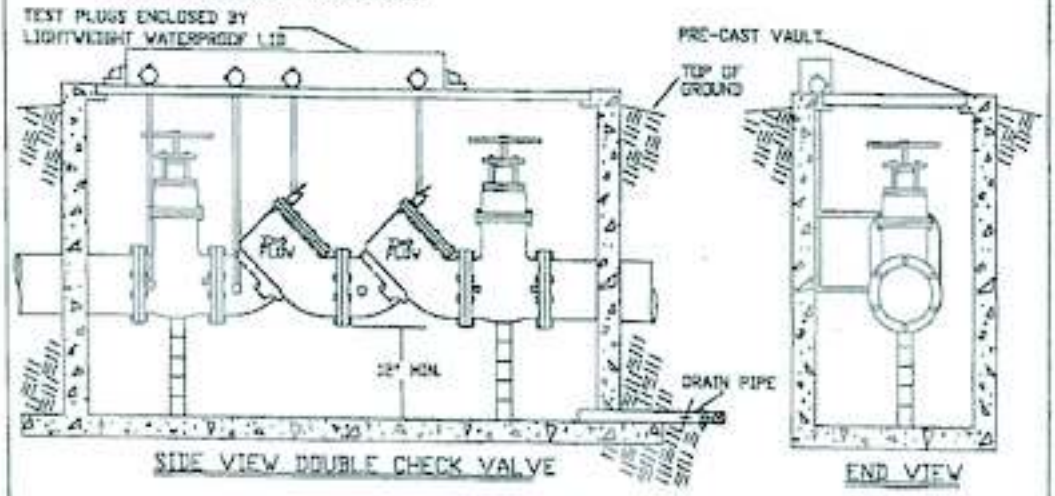


SIDE VIEW DOUBLE DETECTOR CHECK VALVE

END VIEW

NOTES:

1. PIPING FROM DCV OR DDCV TO TEST COCKS SHALL BE COPPER OR BRASS. AND SECURED TO VAULT WALL. SMALL TEST COCKS WILL BE 3/8" COPPER.
2. STEEL VANDAL PROOF BOX ENCLOSING TEST COCKS SHALL BE A MIN. OF 18" LONG, 8" WIDE AND 4" HIGH (BOX SHALL BE INSULATED).
3. DRAIN PIPE SHALL BE ANIMAL PROOF AND SHALL DRAIN TO OPEN AREA (DITCH, GRASS, STREET OR STREAM BED).
4. DRAIN PIPE SHALL BE 4" CORRUGATED PVC PIPE.
5. ANIMAL PROOFING SHALL BE 1/2" HARDWARE CLOTH OVER END OF DRAIN, HELD IN PLACE WITH STAINLESS CLAMP.
6. LID TO VAULT SHALL BE LIGHTWEIGHT AND WATERPROOF.
7. STEPS SHALL BE INSTALLED IN THE VAULT WALL FOR EASY ACCESS TO VAULT.
8. THE LID AND TEST COCK COVER SHALL BE LOCKED WITH MATCHING LOCKS
9. PUBLIC UTILITIES CROSS CONNECTION CONTROL COORDINATOR WILL BE PROVIDED WITH A KEY TO LOCKS.
10. TEST COCKS WILL BE NUMBERED ON THE VAULT OR THE FRAME OF TEST COCK COVER.
11. VAULT SHALL DRAIN TO DAYLIGHT.



SIDE VIEW DOUBLE CHECK VALVE

END VIEW

CITY OF RALEIGH

DEPARTMENT OF PUBLIC UTILITIES

BELOW GROUND DDCV & DCV

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-39	Y.C.A.	6-92		

City of Raleigh
Public Utilities Department

CROSS CONNECTION PROGRAM

October 19, 2009

Technical Bulletin

Re: Insulated Heated Enclosures

PUD Handbook Page 45 #11) all backflow prevention assemblies installed outside of a building must be installed in an approved enclosure with the exception of residential lawn irrigation backflow prevention assemblies. All Enclosures shall be insulated and shall meet the requirements of ASSE standard 1060.

Question: What temperature rating meets the definition of insulated for enclosure protection?

Interpretation:
All insulated enclosures shall meet a minimum of 20 degrees Fahrenheit freeze protection for backflow preventers installed within the City of Raleigh water system.

**This provision is a minimum requirement suitable for normal weather conditions. Abnormally low temperatures may require additional provisions to prevent freezing.*

Also See:
PUD Handbook Page 45, #13) All sprinkler system backflow prevention assembly enclosures shall be equipped with a heater that is recommended by the enclosure manufacturer.

Sincerely,

Danielle Barber

Danielle Barber
City of Raleigh Public Utilities
Cross Connection Program

City of Raleigh
Public Utilities Department

CROSS CONNECTION PROGRAM

December 1, 2009

Technical Bulletin

Affirmation of Existing Public Utilities Policy

Re: City of Raleigh Potable Water Service and Irrigation Wells

City of Raleigh potable water service customers (residential, commercial and industrial) who choose to install a private well for irrigation will be required to install a Reduced Pressure (RP) backflow assembly on their potable service to protect the public water supply from a potential cross connection. The RP is to be installed within 5' after the water meter on the homeowner's property, in an approved enclosure and pad, to protect the assembly from freezing to 20 degrees Fahrenheit. A supplemental heat source may be required to meet the 20 degree Fahrenheit requirement.

Kenneth Waldroup
Assistant Public Utilities Director

Danielle Barber
Cross Connection Program

City of Raleigh
Public Utilities Department

CROSS CONNECTION PROGRAM

December 4, 2009

Technical Bulletin
Policy Clarification
Re: Domestic, Irrigation, Fire Water Service Valve

Domestic and irrigation meter (including bypass)valves are for use by Public Utilities staff only and shall not be used for maintenance or repair of a private water service. (See below)

A fire service valve installed as part of the main tap is considered a public system valve and may not be operated for repair or maintenance of a private fire service system.

A service valve must be installed on the private side of a meter or on a private fire service line prior to the backflow preventer on private property. Backflow preventer valves may not serve as a private service valve.

For split systems installed per PUD water detail W-34 and W-35, each service requires an isolation service valve in case one system fails the other(s) remain functional.

Raleigh City Code

Sec. 8-2013. INJURY TO SYSTEMS; REMOVING, DAMAGING, BREAKING, ETC.
It *shall* be unlawful for any *person* to remove, damage, or interfere with any water or sewer pipes belonging to the *City*, or to remove, break, or injure any portion of any manhole, flush tank, or any part of the water or sewerage of the *utility system*. Provided, it *shall* further be unlawful for any *person* to cut off or discontinue water service to any part of the *City* system without the *written* consent of the Director of Public Utilities.
(Ord. No. 1983-154, §1, 7-19-83; Ord. No. 1986-775, §2, 4-15-86)
Cross reference: Destruction of or damage to utility fixtures, §13-1001.
Editor's note: Ord. No. 1986-775, §3, adopted Apr. 15, 1986, repealed former §8-2013, concerning penalties, as derived from Ord. No. 1986-746, §3,

Kenneth Waldroup
Assistant Public Utilities Director

Danielle Barber
Cross Connection Program